WHAT IS CLAIMED IS:

1. A process for producing polymeric microspheres comprising the steps of:

(a) generating an aerosol of initiated liquid monomeric droplets; and

(b) allowing the aerosol of initiated liquid monomeric droplets to gravitationally fall through an inert gas-filled reaction zone under polymerization reaction conditions and for a time sufficient to substantially polymerize the monomeric droplets and form polymeric microspheres; and

(c) collecting the polymeric microspheres..

2. The process of claim 1, wherein step (a) includes passing the initiated liquid monomeric droplets through a nebulizer and allowing the nebulizer to generate the droplet aerosol.

3. The process of claim 2, wherein step (a) includes positioning the nebulizer near an upper end of a reactor tube which defines the reaction zone, and wherein step (b) includes allowing the aerosol of droplets to fall by gravity through the reaction zone to a lower end of the reactor tube.

4. The process of claim 3, wherein step (c) includes collecting the polymeric microspheres at the lower end of the reactor tube.

5. The process of claim 1, wherein step (a) includes positioning the nebulizer near a lower end of a reactor tube which defines the reaction zone so as to create an upwardly directed plume of droplets , and wherein step (b) includes allowing the droplets in the upwardly directed plume to reverse direction under the influence of gravitational force so that the droplets thereafter fall by gravity through the reaction zone.

6. The process of any one of claims 1-5, which comprises introducing heated air into the reaction zone.

7. The process of any one of claims 1-5, which comprises positioning a least one ultraviolet (UV) light adjacent the reaction zone.

8. The process of claim 1, wherein step (a) comprises supplying to a nebulizer an initiated monomeric liquid comprised of a mixture of a monomer and a polymerization initiator for the monomer.

9. The process of claim 8, wherein the monomer is at least one selected from the group consisting of acrylic acid, acrylamide, poly(ethylene glycol) macromonomers, (meth)acrylic esters, (meth)acrylamides, epoxide group-containing monomers, vinylaromatic hydrocarbons and monomers having at least one at least one hydroxyl, thio, amino, alkoxymethylamino, carbamate, allophanate or imino group per molecule.

10. The process of claim 9, wherein the initiator includes a peroxide or azo initiator.

11. A system for producing polymeric microspheres comprising:

a reactor tube defining an inert gas-filled reaction zone;

a nebulizer for generating an aerosol of initiated liquid monomeric droplets; said nebulizer being positioned relative to the reactor tube to allow the aerosol of initiated liquid monomeric droplets to gravitationally fall through an inert gas-filled reaction zone under polymerization reaction conditions and for a time sufficient to substantially polymerize the monomeric droplets and form polymeric microspheres; and

a collector at a lower end of the reactor tube for collecting the polymeric microspheres.

12. The system of claim 11, wherein the nebulizer is positioned near an upper end of the reactor tube so as to allow the aerosol of droplets to fall by gravity through the reaction zone to a lower end of the reactor tube.

13. The system of claim 12, comprising a heater for heating air, and a blower for introducing the heated air into the reactor tube.

14. The system of claim 11, wherein the nebulizer is positioned near a lower end of the reactor tube so as to create an upwardly directed plume of droplets into the reaction zone, wherein the upwardly directed plume of droplets reverse direction under the influence of gravitational force so that the droplets thereafter fall by gravity through the reaction zone.

15. The system of claim 14, comprising a heater for heating air, and a blower for introducing the heated air into the reactor tube.

16. The system of claim 15, comprising a diffusion ring positioned at an upper end of the reactor tube, the diffusion ring receiving heated air via the blower and having a plurality of outlets for directing the heated air downwardly along an interior wall of the reactor tube.

17. The system of any one of claims 11, which comprises heating means for heating the reaction zone.

18. The system of claim 11, 12 or 14, which comprises at least one ultraviolet (UV) light adjacent the reaction zone.

19. The system of claim 18, wherein the reactor tube comprises at least one UV light window positioned between a respective UV light and the reaction zone.

20. The system of claim 18, comprising a pair of opposed UV lights positioned adjacent the reaction zone.